REMARKS

This application has been reviewed in light of the Office Action dated March 14, 2007. Claims 5, 6, 10-18, and 20-30 are presented for examination. Claims 5, 13, 18, 22, and 27-30 have been amended to define more clearly what Applicants regard as their invention. Claims 5, 13, 18, 22, 27, 28, 29 and 30 are in independent form. Favorable reconsideration is requested.

Claims 5, 6, 10-18 and 20-30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0031972 (*Kitamura et al.*) or U.S. Patent No. 6,645,028 (*Dean et al.*).

Notable features of the amended independent claims are as follows:

- the second voltage level which is applied to a cathode electrode for shifting a bending point of an F-N plot is higher than the maximum applied voltage the cathode electrode has experienced (i.e., that is, the second voltage level is not within a voltage range within which the cathode electrode has been previously operated); and

- increasing of an applying voltage from the first voltage level to the second voltage level causes the shifting of the bending point of the F-N plot from a point corresponding to the first voltage level to a point corresponding to the second voltage level.

The Office Action relied on Fig. 13 of *Kitamura et al.*, to reject the claims. With respect to Fig. 13, *Kitamura et al.* states:

> [0167] The mechanism of the equalizing process according to the present embodiment is described below by referring to FIG. 13. FIG. 13 shows a change in device characteristic before and after the equalizing process.

[0168] The electron-emitting device before the equalizing process shows the characteristic of emitting an electron at the threshold V_{th1} (about 1 V/μm). Then, as described above, when a pulse voltage is applied to the device in the O_2 gas, the electron emission current of the device is suddenly reduced by the mechanism of the chemical etching of the above mentioned carbon. The voltage applied to the device is gradually increased, and the process is performed until no emission is emitted at the threshold voltage of V_{th2}.

[0169] When the device characteristic is evaluated after evacuating the O_2 gas, the characteristic has been changed such that an electron is emitted at the threshold of V_{th2}. At this time, it is assumed that the fluctuation width of the electron emission current obtained by the electron emission has been reduced, and the number of electron emission points has increased in the equalizing process.

[0170] The diameter of an electron beam emitted from the device obtained according to the present embodiment is long in the Y direction and short in the X direction, that is, substantially rectangular.

With regard to *Dean et al.*, the Office Action relies on Fig. 1 and alleges that it teaches "the highest and lowest applied voltage". With regard to Fig. 1, *Dean et al.* states, in part:

FIG. 1 includes a graph 150 of total emission current, I, which is emitted by electron emitter 116; a graph 160 of partial pressure, pX+, of a reactive species, X+; a graph 170 of temperature, T, of the environment in which electron emitter 116 is disposed; and a graph 180 of the gate voltage, VG, at gate extraction electrode 121.

Between times t1 and t2, graph 150 illustrates the initial total emission current, Ii, of electron emitter 116 for a scanning mode configuration of voltages. That is, the potential at cathode 110 is equal to its scanning mode value, which can be ground potential, and the potential at gate extraction electrode 121 is equal to its scanning mode value, VG, S, which can be about 100 volts. This portion of the timing diagram is included to illustrate the initial cumulative emission current capability of carbon nanotubes 119, 118, and 117, and to illustrate the reduction in total emission current, which occurs due to the method of the invention. It is desired to be understood that the method of the invention does not require a distinct step for causing electron emitter 116 to emit prior to the step of selectively reducing the

> lengths of the nanotubes. FIG. 2 corresponds to the portion of the timing diagram of FIG. 1, which is between times t1 and t2.
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> Between times t3 and t4, graph 150 illustrates a preferred example of the method of the invention. In the example of FIG. 1, the steps of causing a first carbon nanotube to be reduced in length at a first rate and causing a second carbon nanotube to be reduced in length at a second rate comprise the step of causing a burn-in current to be emitted by electron emitter 116. This step is further represented by FIG. 3.
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> In accordance with the invention, the burn-in current, IB, is sufficient to cause removal of carbon from end 123 of at least first carbon nanotube 119. In the example of FIGS. 1 and 3, the burn-in current causes carbon removal from first carbon nanotube 119 and second carbon nanotube 118, but not from third carbon nanotube 117. Preferably, carbon removal is achieved by causing greater than about one microampere to be emitted by each nanotube that is to be selectively burned.

However, it is respectfully submitted that nothing in either *Kitamura et al.* or *Dean* would teach or suggest the features now recited in the independent claims relating to the features mentioned above. Accordingly, those claims are believed to be clearly patentable over *Kitamura et al.* and *Dean et al.*

The other claims in this application are each dependent on one or another of the independent claims discussed above, and also are believed to be patentable over the art relied on in the Office Action for the same reasons as are those independent claims. Since each dependent claim is deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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